

INTEGRATED TRANSPARENT SUBSTRATE AND DIFFRACTIVE OPTICAL ELEMENT

ABSTRACT

5 A diffractive optical element (DOE) is shown formed on a substrate. The
DOE is characterized, in one embodiment, by being formed from a plurality of
members that are each individually created on a top surface of the substrate. The
members may be formed by depositing a poly-silicon material on the substrate or by
growing a silicon crystal on the substrate and performing an etch step. The substrate
10 may be formed of a sapphire crystal. The DOE may be used to reflect incident light
traveling within the substrate under total internal reflection. The widths, spacing
between, and heights of the strips forming the DOE may be designed so as to reflect
the incident light within the substrate in a direction of propagation acute to that of the
incident light.

09905769-071301